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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/790,786

03/03/2004

Jingyu Lian

0928.0067C

4369

27896

7590

09/20/2005

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ROCKVILLE, MD 20850

EXAMINER

HARRISON, MONICA D

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b> 10/790,786	<b>Applicant(s)</b> LIAN ET AL.	
	<b>Examiner</b> Monica D. Harrison	<b>Art Unit</b> 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 9, 10, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Shen et al (6,207,584 B1).

1. Regarding claim 1, Shen et al discloses a method for forming a (111) oriented crystalline dielectric layer comprising: forming a first capacitor electrode layer (Figure 5, reference 18) on a substrate (Figure 5, *substrate*); exposing the substrate to a first gas that includes material to form the dielectric layer at a first temperature (column 4, lines 9-15); and exposing the substrate to a second gas that includes material to form the dielectric layer at a second temperature, wherein the second temperature is higher than the first temperature (column 4, lines 17-21), wherein a (111) oriented crystalline dielectric layer is formed (column 1, lines 57-67 thru column 2, lines 1-4).

2. Regarding claim 2, Shen et al discloses wherein the first gas includes material that forms an oxide or titanate (column 2, lines 49-57).

3. Regarding claim 9, Shen et al discloses a method for forming a (111) oriented crystalline barium strontium titanium oxide layer with high capacitance comprising: depositing a capacitor electrode layer on a substrate, wherein the electrode layer comprises a crystalline oriented film (column 3, lines 63-67 thru column 4, lines 1-4); nucleating a seed layer for

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effecting a (111) orientation of the barium strontium titanium oxide (BSTO), wherein the substrate is exposed to a gas comprising a metal oxide at a first temperature (column 4, lines 4-30); and growing a continuous layer of (111) oriented barium strontium titanium oxide (Figure 5, reference 136), wherein the substrate is exposed to a gas comprising barium, strontium, titanium, and oxygen at a second temperature (column 4, lines 21-67 thru column 5, lines 1-20).

4. Regarding claim 10, Shen et al discloses preparing the metal surface before the step of nucleating a seed layer (column 4, lines 8-15).

5. Regarding claim 19, Shen et al discloses a method for growing a (111) oriented BSTO crystalline layer for use as a capacitor comprising: forming a (111) oriented crystalline first electrode (Figure 5, reference 18) on a substrate (Figure 5; *substrate*); heating the substrate to a temperature sufficient to render the electrode surface substantially clean, but less than that necessary to cause a degradation in the (111) crystalline orientation of the surface (column 4, lines 4-15); heating the substrate to a second temperature and exposing the substrate to a gas including the elements comprising a first metal oxide, wherein the second temperature is sufficiently high to form a plurality of crystalline seeds required to subsequently form the (111) oriented crystalline BSTO layer, and further wherein the second temperature is less than that necessary to cause a degradation in the degree of (111) crystalline orientation of the BSTO crystalline layer (column 4, lines 16-30); and heating the substrate to a third temperature and exposing the substrate to a gas including the elements comprising a second metal oxide, wherein the third temperature is sufficiently high to grow a (111) oriented crystalline BSTO layer from the crystalline seeds (column 4, lines 31-51).

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6. Regarding claim 20, Shen et al discloses wherein the first metal oxide and second metal oxide are the same (column 2, lines 31-48).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen et al (6,207,584).

7. Regarding claims 3 and 4, Shen et al discloses a first and second gas (column 4, lines 9-30; claim 3) and the gas comprising barium, strontium, titanium, and oxygen (column 4, lines 16-21; claim 4). However, Shen et al does not disclose both the first and second gasses to be the same.

It would be obvious to use the same gasses to form the dielectric layer because Shen et al discloses in the nucleation step that the surface is exposed to BSTO deposition gas (column 4, lines 16-18) and after the nucleation, a dielectric of the same material as the nucleation step is deposited (column 4, lines 40-42). These gasses are used for depositing a dielectric used to increase the capabilities of the dielectric layer between two capacitor electrodes to improve performance and reduce possible leakage.

8. Regarding claims 5, Shen et al discloses wherein the first electrode comprises a (111) oriented conductor (Figure 5, reference 28).

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9. Regarding claims 6, Shen et al discloses wherein the first temperature is less than about 500 degrees Celsius and greater than or equal to about 430 degrees Celsius (column 4, lines 9-15; *room temperature*).

10. Regarding claims 7, Shen et al discloses wherein the duration of the exposure of the first gas at a first temperature is about 2 to 30 seconds (column 4, lines 9-15; *room temperature*).

11. Regarding claims 8, Shen et al discloses wherein the second temperature is greater than about 600 degrees Celsius (column 4, lines 23-30).

Claims 11-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shen et al (6,207,584) in view of Wunderlich (6,727,537 B2).

12. Shen et al discloses all above claimed subject matter except the metal electrode comprises (111) oriented platinum (claim 11).

Wunderlich discloses the metal electrode layer comprising platinum (Figure 1, reference 8; column 2, lines 54-57).

Since Shen et al and Wunderlich are both from the same field of endeavor, the purpose disclosed by Wunderlich would have been recognized in the pertinent art of Shen et al.

It is obvious, at the time the invention was made, for one with ordinary skill in the art, to modify Shen et al with the teachings of Wunderlich for the purpose of using platinum as an intermediate buffer layer for a magnetic conductive strip used in a magnetic memory cell in order to keep minimum sized memory cells stable at room temperature.

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13. Regarding claim 12, Shen et al discloses wherein preparing the metal surface includes exposing the substrate to a third temperature for less than about 60 seconds (column 4, lines 14-30).

14. Regarding claim 13, Shen et al discloses wherein the gas used for nucleating a seed layer and the gas used for growing a continuous film are the same (column 4, lines 39-51).

15. Regarding claim 14, Shen et al discloses wherein the first temperature is less than about 500 degrees Celsius and greater than or equal to about 430 degrees Celsius (column 4, lines 16-30).

16. Regarding claim 15, Shen et al discloses wherein the duration of the exposure of the substrate to a gas comprising a metal oxide at a first temperature is about 2 to 30 seconds (column 4, lines 4-50).

17. Regarding claim 16, Shen et al discloses wherein the second temperature is greater than about 600 degrees Celsius (column 4, lines 4-50).

18. Regarding claim 17, Shen et al discloses wherein the first temperature is about 460 degrees Celsius (column 4, lines 4-50).

19. Regarding claim 18, Shen et al discloses wherein the continuous layer of (111) oriented barium strontium titanium oxide has a thickness of about 5 to 30 nanometers (column 5, lines 1-2).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

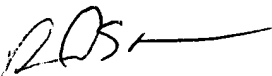
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Monica D. Harrison  
AU 2813

mdh  
September 2, 2005

  
**DAVID BLUM**  
**PRIMARY EXAMINER**